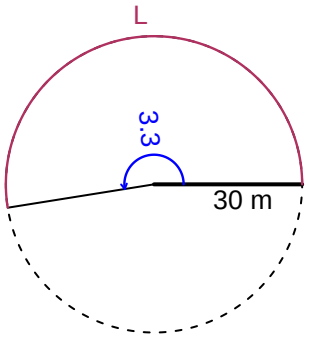
Name: Date:

Trig Final (TEST v693)

- You can use a calculator (like Desmos)
- You should have a unit-circle with special angles and coordinates marked.

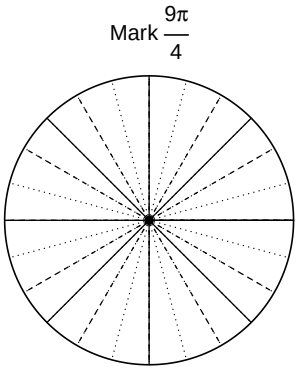
Question 1

In the figure below, we see a circle and a central angle that subtends an arc. The angle measure is 3.3 radians. The radius is 30 meters. How long is the arc in meters?

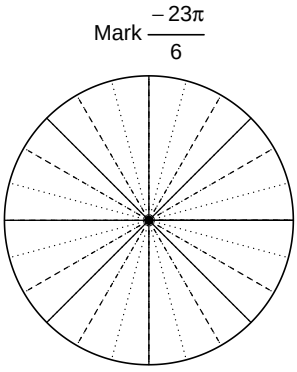


Question 2

Consider angles $\frac{9\pi}{4}$ and $\frac{-23\pi}{6}$. For each angle, use a spiral with an arrow head to **mark** the angle on a circle below in standard position. Then, find **exact** expressions for $\cos\left(\frac{9\pi}{4}\right)$ and $\sin\left(\frac{-23\pi}{6}\right)$ by using a unit circle (provided separately).



Find $\cos(9\pi/4)$



Find $\sin(-23\pi/6)$

Question 3

If $\sin(\theta) = \frac{-40}{41}$, and θ is in quadrant III, determine an exact value for $\tan(\theta)$.

Question 4

A mass-spring system oscillates vertically with a midline at $y = 8.37$ meters, an amplitude of 2.36 meters, and a frequency of 3.72 Hz. At $t = 0$, the mass is at the midline and moving down. Write an equation to model the height (y in meters) as a function of time (t in seconds).